

# Work Order ID 72941

Thursday, August 18, 2011 1:40:09 PM



Page 1

Item ID: D205-634-041

Accept



Setup Start



Revision ID:

Stop



Item Name: Replacement Skidtube

Start Date: 8/18/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 9/5/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals: Process Plan:

*[Signature]*

Date: 8/18/11

Tooling:

Date:

Run Start



QC:

Date:

SPC (Y/N):

Date:

Stop



Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

Draw Nbr

Revision Nbr

D2580-041

Rev.D DEO-D1

100

0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy D205-634 bluefile & type labels per PPP D205-634-041 CHG002

N/A *[Signature]*

110

0.00



BENDING MACHINE - SKIDTUBES

CNC Bend I

Memo

0.00

CNC Delta 100 Bender

1-Bend as per program D2580.C on CNC Bender and Folio 16

2-Cut tubes as per Dwg. D2580

3- scribe batch# in aft end of tube

*[Signature]* BE 11/08/12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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QC: Date: SPC (Y/N): Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

120

0.00



Skidtubes

Memo

0.00

Skidtubes

1- Deburr ends and remove bending marks

2- Prepare tube for welding as per QSI 004

130

0.00



QC

QC5- Inspect part completeness to step on W/O

Memo

0.00

Quality Control

*Wh*  
*11/08/23**Subs/24**(u)*

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Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

140

0.00



Skidtubes

Memo

0.00

Skidtubes

1-Weld step D2576 as per Dwg. D2580 and QSI 004.

A/R 11/11 Aluminum Rod

M117884

BE 11/08/24

2-Grind welds on step as per Dwg D2580

3-Weld spacers as per dwg D2580

BE 11/08/24

WEIDED A/R M117884

3- \*\*\* N/A\*\*\*\* Insert D4202-1 spacer, swage as per QSI002 and trim/ grind flush per QSI002 and dwg. Hold x-bolt with DT9701 Use tube expander 1/2 x17G to start expansion and finish with 1/2 x 18G to achieve dwg dimension.

4-Drill holes for wearplates using DT 8217 &amp; DT8937 Open holes to 19/64", adjust stopper not to hit web. Debur

6-Drill pilot holes for aft cap using DT 8215 Open holes to 0.208". Debur

7-Drill pilot holes for Tow ring using DT8091, open to .640" and Debur

3 BE 11/08/25

W/O:		WORK ORDER CHANGES					
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Date:

Run Start

QC:

Date:

SPC (Y/N):

Date:

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

QC10- Inspect visual per QSI004- ground welds

0.00



QC

Memo

0.00

Quality Control

8 u log / 25

160

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

8 u log / 25

170

Pressure Wash per QSI005 4.3

0.00



HandFinish

Memo

0.00

Hand Finishing

Re-alodine tube as per QSI 005 section 4.1.2.1 do not acid etch and leave fwd cap out of solution.

HJ m-11/08/29

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QC: Date: SPC (Y/N): Date:

Run Start

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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180	White Gloss(Ref:4.3.5.1) per QSI005 4.3-Alum	0.00							
-----	--	------	--	--	--	--	--	--	--



Powdercoat

Powder Coating

Memo

START TIME:

OVEN TEMPERATURE:

FINISH TIME:

3:15  
320°F  
3:45

190	QC3- Inspect Part Finish	0.00							
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QC

Quality Control

Memo

IX Ø M-L 11/08/29

1 Ø M-L 11/08/30

W/O:		WORK ORDER CHANGES					
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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

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Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

200

0.00



HandFinish

Memo

0.00

Hand Finishing

1-Install inserts & wearplates & Gaskets as per Dwg. D2580. Use a drop of

Sikaflex on insert holes before installing wearplates

A/R ☐ ☐ ☐ Sikaflex-291 M118393

Sikaflex expire date: 12/05

2-Coat D2594-3 O' rings with Petroleum Jelly and install on D2594-1 plugs as per Dwg D2580

3-Inspect for foreign object per QSI 024

4-Install 2855 Aft Cap as per Dwg D2580 and seal Fwd Step & Aft Cap with Sikaflex. Clean excess adhesive

A/R ☐ ☐ ☐ Sikaflex-291 M118393

Sikaflex expire date: 12/05

5-Wing Walk as per Dwg D2580 and QSI 005 4.4

Batch: M118313

1 of 108130

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
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Run Start



Approvals: Process Plan: Date: Tooling: Date:

Stop



QC: Date: SPC (Y/N): Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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210

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

Inspect Aft Cap, Fwd Step and Wing Walk of work to Current Step Inspect for Foreign objects per QSI 024

220

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPPD205-634-041

Location: \_\_\_\_\_

PPP Rev: \_\_\_\_\_

230

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

8 w/69/31

PPP 72939

11/9/13

11/9/14

MF 11-09-13

**Dart Aerospace Ltd**

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Parent Item Name: Replacement Skidtube

Start Date: 8/18/2011

Required Date: 9/5/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:N 02.08.28 FP was QC5 in Step 27; Added QC5 to Step 30  
KJ IPP Rev P 10.02.19  
per PAR09-043 EC verified by:DD  
IPP Rev. O 06.02.28 Added paperwork EC  
IPP Rev:P 07-07-09 SS Wearplates & Gaskets JLM IPP Rev:Q  
10.12.01 as per chg003 DD verf:EC

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
---------------------------------	------------------------	---------------	-------------	---------------------	------------------	-----------------	--------------------	----------------	-------------	--------------	---------------	----------------	--------

D4202-1 **D2579**



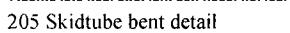
Spacer

Manufactured No 140 Each 443.0000 20 20

Location	Loc Qty	Loc Code
LG002	443	
66929	106	
67129	196	
67308	1	
67430	140	

BE 4/08/24  
B 72672 x 20

D2580-1



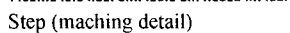
205 Skidtube bent detail

Manufactured No 110 Each 1.0000 1 1

Location	Loc Qty	Loc Code
LG	1	
71014	1	

BE 11/08/22  
B 72840 x 1

D2576-3



Step (maching detail)

Manufactured No 140 Each 30.0000 1 1

Location	Loc Qty	Loc Code
LG	30	
66156	30	

BE 11/08/24

W/O:		WORK ORDER CHANGES					
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Page 2

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Parent Item: D205-634-041

Parent Item Name: Replacement Skidtube

Start Date: 8/18/2011

Required Date: 9/5/2011

Start Qty: 1.00

Required Qty: 1.00

D2855 Manufactured No

200 Each

32.0000

1

1



1108130

Cap

## Location

## Loc Qty

## Loc Code

FP007

32

65519

2

65569

30

AN3-5A Purchased No

200 Each

1,037.000

2

2



1108130

Bolt

## Location

## Loc Qty

## Loc Code

ST350

1037

115371

46

117423

691

118626

300

AN960JD10L NAS1149D0332J Purchased No

200 Each

0.0000

2

2



1108130

Washer

ALS7-1032-130 Purchased No

200 Each

1,155.000

50

50



1108130

Insert

## Location

## Loc Qty

## Loc Code

ST282

1155

117717

899

118386

256

1108237

150

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Shop Packet Print

Page 2

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Start Qty: 1.00

Required Qty: 1.00

AN3C4A Purchased No 200 Each 2,621.000 50 50  
  
 BOLT

Location	Loc Qty	Loc Code
ST350	2621	
117313	2	
117688	36	
117795	1	
117872	22	
118012	20	
118112	40	
118451	1000	
118628	1500	

AN960C10L NAS1149C0332 Purchased No 200 Each 0.0000 50 50

  
 washer

D3566-13 Manufactured No 200 Each 27.0000 1 1

  
 Gasket

Location	Loc Qty	Loc Code
FP	8	
69281	8	
FP014	19	
68341	1	
72149	18	

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Required Date: 9/5/2011

Start Qty: 1.00

Required Qty: 1.00

D3566-5 Manufactured No

200 Each

26.0000

1

1



Gasket



ul 1108130

Location

Loc Qty

Loc Code

FP015

26

68961

1

71601

5

72849

20

21

D3566-1 Manufactured No

200 Each

32.0000

2

2



Gasket



ul 1108130

Location

Loc Qty

Loc Code

FP011

2

71580

2

FP015

30

68924

2

72848

28

22

D3564-11 Manufactured No

200 Each

16.0000

1

1



Wearshoe



ul 1108130

Location

Loc Qty

Loc Code

FP019

2

67591

2

FP020

14

72207

14

21

W/O:		WORK ORDER CHANGES					
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Required Date: 9/5/2011

Start Qty: 1.00

Required Qty: 1.00

D3564-13

Manufactured No

200 Each

12.0000

1

1



Wearshoe



u/108130

Location

Loc Qty

Loc Code

FP016

6

69280

6

FP017

6

71594

6

D3564-9

Manufactured No

200 Each

18.0000

1

1



Wearshoe



u/108130

Location

Loc Qty

Loc Code

FP019

6

67590

4

69943

2

FP020

12

72208

12

D3564-5

Manufactured No

200 Each

16.0000

1

1



Wearshoe



u/1108130

Location

Loc Qty

Loc Code

FG

2

34806

2

FP019

14

70864

2

72164

12

W/O:		WORK ORDER CHANGES					
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Required Date: 9/5/2011

Start Qty: 1.00

Required Qty: 1.00

D2594-3 Manufactured No

200 Each

612.0000 16 16



O-Ring, 205 Skidtube



u108130

Location

Loc Qty

Loc Code

FP-A

612

65518

41

66952

571

x16

D2594-1 Manufactured No

200 Each

306.0000 16 16



Plug, 205 Skidtube



u108130

Location

Loc Qty

Loc Code

FP-A

306

42807

28

67441

7

68943

70

72127

201

x16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**DART**

DESIGN <i>[Signature]</i>	DRAWN BY <i>[Signature]</i>	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
CHECKED <i>[Signature]</i>	APPROVED <i>[Signature]</i>	DRAWING NO. D2580	REV. D SHEET 1 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE NTS
A	96.09.16	NEW ISSUE	
B	96.12.02	AS MANUFACTURED	
C	98.08.26	REDRAWN, INCLUDED DEO 9094/9097	
D	07.02.27	CHANGE TO SS WEARPLATES AND GASKETS, INCLUDE DEO 9124/9183	

**RELEASED**  
07.06.28 *[Signature]***DEO ATTACHED**  
**UNDER REVIEW***[Signature]*  
RMV *[Signature]*

QTY -041	QTY -045	Part Number	Description
X		D2580-041	SKIDTUBE ASSEMBLY
	X	D2580-045	SKIDTUBE ASSEMBLY
1	1	D2500-1-190	EXTRUSION
1	1	D2576-3	STEP
20	24	D2579	CROSS BOLT SPACER
16	16	D2594-1	PLUG
16	16	D2594-3	O-RING
1	1	D2596	205 WEB
1	1	D2855	AFT CAP
1	1	D3564-5	WEARSHOE
1	1	D3564-9	WEARSHOE
1	1	D3564-11	WEARSHOE
1	1	D3564-13	WEARSHOE
2	2	D3566-1	GASKET
1	1	D3566-5	GASKET
1	1	D3566-13	GASKET
50	50	ALS7-1032-130 or AKS7-1032-130 or AKS4-1032-130 or AELS-1032-130	INSERT
50	50	AN3C4A	BOLT
2	2	AN3-5A	BOLT
50	50	AN960C10L	WASHER
2	2	AN960JD10L	WASHER

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. *[Signature]**[Signature]***GENERAL NOTES:**

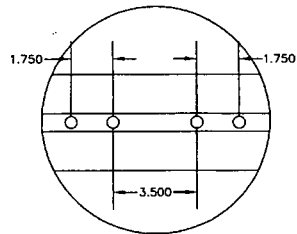
- 1) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED
- 2) ALL DIMENSIONS ARE IN INCHES
- 3) INSERT D2596 WEB TO LOCATION SHOWN OFF AFT END OF SKIDTUBE AND BOND WEB INTO OUTER TUBE WITH NON-STRUCTURAL SIKAFLEX-241 ADHESIVE PER DART QSI 015 BEFORE BENDING. ENSURE HOLES LINE-UP.
- 4) BEND AS A SMOOTH RADIUS STARTING WITH A MAXIMUM CENTERLINE RADIUS OF 60 AND ENDING WITH A MINIMUM RADIUS OF 30. A MAXIMUM REDUCTION OF 0.200 IN DIAMETER IS ALLOWABLE IN THE BENT PORTION OF THE TUBE.
- 5) USE DART DRILL TEMPLATE TD2577-205 TO LOCATE AND DRILL Ø0.297 HOLES FOR WEARSHOE INSERTS. INSTALL ALS7-1032-130 PER SECTION D-D (50 PLACES) AFTER FINISH. INSTALL AN3C4A BOLTS AND AN960C10L WASHERS WITH SIKAFLEX-241/-291.
- 6) WELDING TO BE DONE PER DART QSI 004.
- 7) FINISH:  
SEE NOTES ON  
PAGE 2 FOR D2580-041 AND  
PAGE 3 FOR D2580-045
- 8) INSERT D2594-1 PLUG C/W D2594-3 O-RING IN HOLES MARKED 'P' (BOTH SIDES OF TUBE) AFTER FINISH (16 PLACES).

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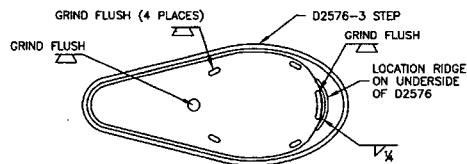
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**DETAIL A**  
SCALE 5:24



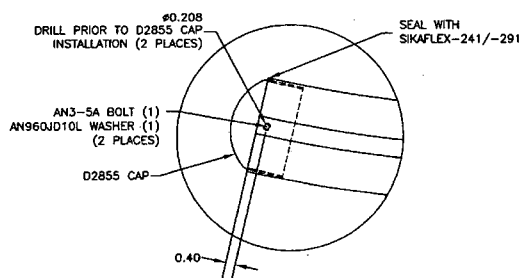
**DETAIL B**  
SCALE 5:24



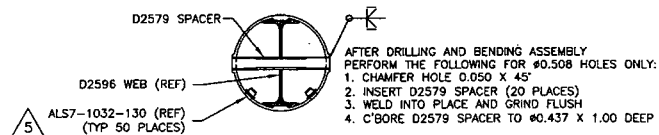
**RELEASED**  
07.06.28

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RMV 07.06.30

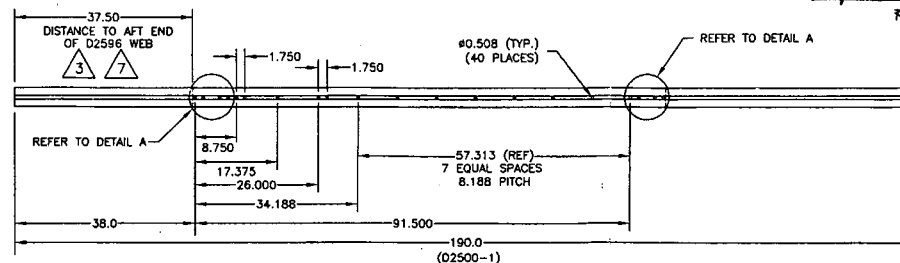
**DETAIL C**  
SCALE 5:24



**SECTION D-D**  
SCALE 5:24



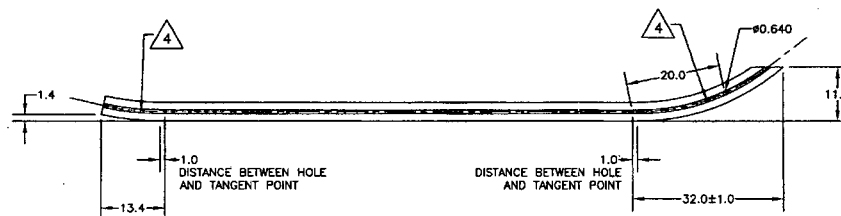
**D2580-1 DRILLING DETAIL**



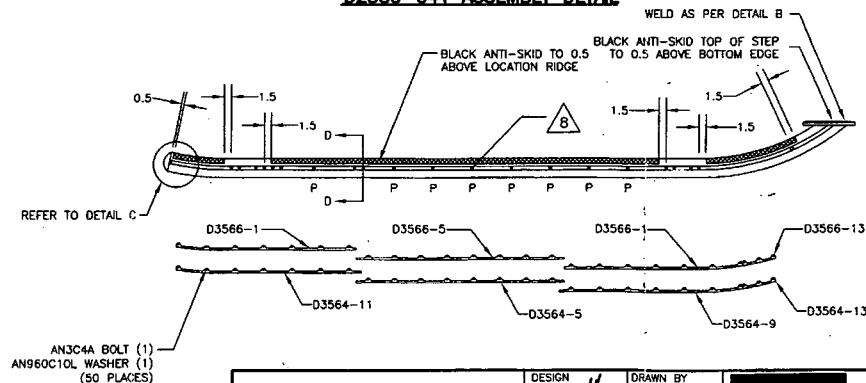
**UNDER REVIEW**

RMV 07.06.30

**D2580-1 BENDING AND CUTTING DETAIL**



**D2580-041 ASSEMBLY DETAIL**



**D2580-041 NOTES**

- i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB  
POWDER COAT ASSEMBLY GLOSS WHITE (REF. 4.3.5.1) PER DART QSI 005 4.3  
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

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DRAWN BY

**DART**

DART AEROSPACE LTD.  
HARRISBURG, ONTARIO, CANADA

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DATE

TITLE

SHEET 2 OF 3

07.02.27

205 SKIDTUBE ASSEMBLY

SCALE 1:24

RELEASED  
07-06-28

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Technical drawing of a circular base plate with a central hole and a rectangular cutout. The drawing includes dimensions and labels for components and assembly steps:

- DRILL PRIOR TO D2855 CAP INSTALLATION (2 PLACES)**: Points to two small circles on the left side of the plate.
- AN3-5A BOLT (1)**: Points to a bolt passing through the central hole.
- AN960UD10L WASHER (1)**: Points to a washer on the bolt.
- D2855 CAP**: Points to the cap being installed on the bolt.
- SEAL WITH SIKAFLEX-241/-291**: Points to the rectangular cutout.
- SEE NOTE ii)**: Points to the rectangular cutout.
- 0.40**: Dimension line indicating the width of the rectangular cutout.
- 0.208**: Dimension line indicating the diameter of the central hole.

Diagram illustrating the components of a wheel assembly:

- D2579 SPACER
- D2596 WEB (REF)
- ALS7-1032-130 (REF) (TYP 50 PLACES)

After Performance Inspection (APFI) points:

1. CHA
2. INS
3. WE
4. C'B

AFTER DRILLING AND BENDING ASSEMBLY  
PERFORM THE FOLLOWING FOR #0.508 HOLES ONLY:

1. CHAMFER HOLE 0.050 X 45°
2. INSERT D2579 SPACER (20 PLACES)
3. WELD INTO PLACE AND GRIND FLUSH
4. C'BORE D2579 SPACER TO #0.437 X 1.00 DEEP

i) FINISH: ACID ETCH, ALODINE PER DART QSI 005 4.1 PRIOR TO INSERTING D2596 WEB  
POWDER COAT ENTIRE ASSEMBLY GREEN (REF. 4.3.5.8) PER DART QSI 005 4.3  
BLACK ANTI-SKID PAINT AS INDICATED PER DART QSI 005 4.4

ii) IT IS ACCEPTABLE TO GRIND A RELIEF IN THE D2855 AFT CAP TO PREVENT INTERFERENCE  
WITH THE SPACER AT THIS LOCATION

37.50  
DISTANCE TO AFT END  
OF D2596 WEB

3  
7

1.750 1.750

#0.508 (TYP.)  
(40 PLACES)

REFER TO DETAIL E

REFER TO DETAIL A

8.750 17.375 26.000 34.188 57.313 (REF)  
7 EQUAL SPACES  
8.188 PITCH

38.0 91.500 190.0  
(D2500-1)

(MAKE FROM D2580-1 DRILLING DETAIL)

5.985  
1.4  
5.338 (REF)  
51.340  
39.580  
5.915  
3.630 (REF)  
20.0  
11.0  
1.0  
13.4  
32.0 ± 1.0  
0.640  
4  
0.508 (8 PLACES)  
DISTANCE BETWEEN HOLE AND TANGENT POINT

**HULL ASSEMBLY DETAIL F**

WELD AS PER DETAIL F

BLACK ANTI-SKID TO 0.5 ABOVE LOCATION RIDGE

BLACK ANTI-SKID TOP OF STEP TO 0.5 ABOVE BOTTOM EDGE

NO C'BORE NO PLUG

NO C'BORE NO PLUG

NO C'BORE NO PLUG

NO C'BORE NO PLUG

D3566-1

D3566-5

D3566-1

D3566-13

D3564-11

D3564-5

D3564-9

D3564-13

AN3C4A BOLT (1)

AN960C10L WASHER (1)

(50 PLACES)

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CHECKED <i>H</i>	APPROVED <i>HA</i>	DRAWING NO. D2580	REV. D SHEET 3 OF 3
DATE 07.02.27		TITLE 205 SKIDTUBE ASSEMBLY	SCALE 1:24

NO. 262

AWS D17.1.2001  
QUALIFICATION TEST RECORD

Name: Barclay Elliott  
Job number: B71946  
Part number: D205 634 041  
Description: 205  
Welding Process: Tig[☒] Mig[ ]  
Base material: Aluminum  
Current: AC[☒] DC[ ]

TEST REQUIREMENTS AND RESULTS

Visual: pass[☒] fail[ ]  
Penetration: pass[☒] fail[ ]

UNACCEPTABLE

Cracks: pass[☒] fail[ ]  
Undercut: pass[☒] fail[ ]  
Pin holes: pass[☒] fail[ ]  
Overlap (cold lap): pass[☒] fail[ ]  
Porosity (surface): pass[☒] fail[ ]  
Coloration: pass[☒] fail[ ]

Qualifier Barclay Elliott Date of Test Coupon 11-08-11  
Welder Barclay Elliott Date of Test Coupon 11-08-11

The above named individual is qualified in accordance with AWS D17.1.2001 to weld